

Chemical Bonding

All chemical bonding is an electrostatic force of attraction

Electrostatic force means the force between two charges

“like charges repel
unlike charges attract”

Electrostatic attraction means an attraction between oppositely charged particles

In Chemistry, the attraction is between the electrons and nucleus

because electrons are negatively charged and positive protons are found in the nucleus

useful additional info...

Coulomb's law

describes the electrostatic interaction between electrically charged particles which states that...

the force between two charged particles

is directly proportional to the product of the charges

and

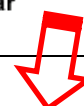
is inversely proportional to the square of the distance between them.



$$F_e = \frac{kq_1q_2}{r^2}$$

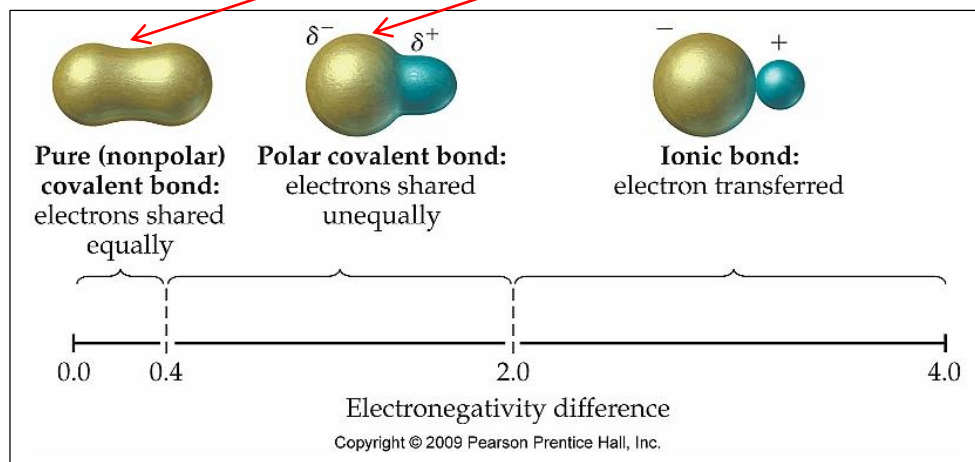


Type of bond	1) Metallic	2) Ionic	3) Covalent	
type of substance	3D metallic	3D ionic	molecular	network covalent giant covalent
examples	<i>eg Na, Cu, Mg, Fe</i>	<i>eg NaCl, MgF₂, Li₂O</i>	<i>eg. H₂, Cl₂, O₂</i>	<i>eg 2D graphite, 3D diamond, 3D buckyball, 3D SiO₂</i>
particles	metal cations and electrons	cations and anions	molecules	atoms
strength	strong	strong	strong covalent bond between atoms weak force between molecules	very strong covalent bond
image				



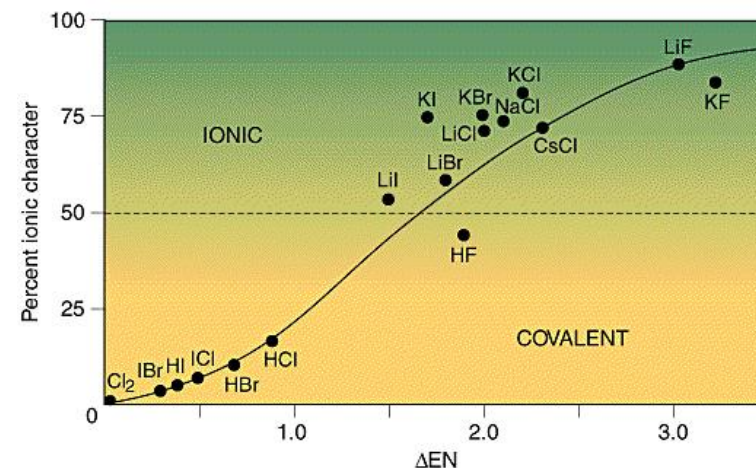
Let's look at **Ionic bonding** and **Covalent bonding** (specifically **molecular substances**) in more detail

Molecular substances contain covalent bonds between atoms, **INSide** the molecule (**INTRAmolecular** force)
the covalent bond(s) will be either **pure covalent** or **polar covalent**



useful additional info...

Ionic bonds, polar covalent bonds and pure covalent bonds all sit along a continuum



Molecular substances also contain weak forces **BETWEEN** molecules (**INTERmolecular** forces)

There are **THREE** different types of Intermolecular force /van der Waals force

A Hydrogen bond forms between a H atom (which is <u>directly</u> bonded to a N, O, F atom within the same molecule) and N, O, F (also directly bonded to a H atom) of <u>another</u> molecule.	Permanent dipole/Dipole-dipole forms between dipole positive end of one molecule and dipole negative end of another	Temporary dipole/ Instantaneous dipole/Dispersion force/ London force
<p>Hydrogen</p> <p>Oxygen</p> <p>Covalent Bond (strong)</p> <p>Hydrogen Bond which is a weak intermolecular force</p>	<p>Covalent bond (strong)</p> <p>Permanent dipole/ dipole -dipole which is a weak-intermolecular force</p>	<p>Covalent Bond (strong)</p> <p>Temporary dipole/ instantaneous dipole/ dispersion force/ London force which is a weak intermolecular force</p>